

EXHIBIT A

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December 8, 2023

BY EMAIL

Matthew Podolsky
Alexandra Rothman
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Assistant United States Attorneys
United States Attorney's Office
Southern District of New York
One Saint Andrews Plaza
New York, New York 10007

Re: United States v. Sung Kook (Bill) Hwang, et al., No. 22 Cr. 240 (AKH)

Dear Counsel:

Pursuant to Federal Rule of Criminal Procedure 16(b)(1)(C), we provide notice that the defense anticipates calling Dr. Michael Johannes as an expert witness at trial. In addition to the subjects of testimony described below, Professor Johannes may give testimony responding to and rebutting testimony given by the government's expert witnesses.

Set forth below are Professor Johannes's qualifications and a summary of his anticipated testimony. We reserve the right to update, amend, and/or supplement the below summary of testimony based on further developments, including the disclosure of the testimony and exhibits to be offered by the government in its case-in-chief, and/or the receipt of documents or other evidence from the government or third parties prior to trial.

I. QUALIFICATIONS

Professor Johannes is an economist with extensive research, publishing, and teaching experience in financial markets, with a particular focus on financial and statistical analysis related to the pricing and risk of securities and derivatives.

Professor Johannes is the Ann F. Kaplan Professor of Business and Chair of the Finance Division at Columbia University's Graduate School of Business. In that role, he

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teaches fundamental concepts in financial markets, investments, and derivatives to MBA, executive MBA, Masters, and Ph.D. students, including the fundamentals of valuation and volatility, frameworks for investments and decision-making, portfolio construction and analytics, risk measurement and management, derivative markets, the uses, pricing, and hedging of derivative instruments, and understanding financial crises and periods of heightened volatility. He previously taught a course on derivatives to MBA students at the Kellogg School of Management at Northwestern University, as well as courses on mortgages, derivatives, Treasuries, and credit markets at the Woodrow Wilson School of Public Policy at Princeton University. Professor Johannes has also taught customized executive-level education programs on the subjects listed above.

His publications include peer-reviewed papers on the swap market, pricing of securities and derivative instruments, macroeconomic risk and volatility, and the impact of earnings announcements on the price of securities. In 2007, the paper “Pricing Collateralized Swaps,” which he co-authored, was awarded “Best Academic Paper of the Year” at the Global Alternative Investment Managers (GAIM) annual conference; it was later published in the *Journal of Finance* under the title “The Impact of Collateralization on Swap Rates.”

He has presented at economic and financial research seminars hosted by leading universities (*e.g.*, Harvard University, London School of Economics, Oxford University, Stanford University, the Massachusetts Institute of Technology, Northwestern University, U.C.L.A., the University of Chicago, the University of Pennsylvania, and Yale University), market participants (*e.g.*, Caspian Capital Management, Citigroup, Morgan Stanley, Goldman Sachs, and Lehman Brothers), and central banks (*e.g.*, the Federal Reserve System (the Board of Governors, N.Y. Fed., S.F. Fed.)). Professor Johannes has presented at conference seminars around the world, including giving the keynote address at the IFSID & Bank of Canada Conference on Derivatives in 2013, and has served as a referee for 29 economics and finance journals.

From 2003 to 2012, Professor Johannes served as a consultant to Caspian Capital Management, a hedge fund specializing in trading over-the-counter instruments and derivatives including mortgage-backed securities, interest rate swaps and options, and U.S. government bonds, futures, and futures options. In his capacity at Caspian Capital Management, Professor Johannes consulted on a variety of issues, including derivatives valuation, portfolio and trading strategies, risk management and oversight, and financial crises and periods of heightened volatility. From 2003 to 2008, he spent approximately one day per week at Caspian Capital Management. From July 2008 to June 2009, during the financial crisis, his role expanded, and he spent at least three days per week at the firm during a sabbatical from Columbia Business School.

From 2012-2020, Professor Johannes was a consultant to a commodity trading advisor (CTA) that specializes in trading futures and futures options. His role included overseeing quantitative research efforts, forecasting and managing portfolio risks, and building a quantitative and algorithmic trading system in futures and futures options.

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Professor Johannes oversaw portfolio construction and trading, including trade execution strategies and implementation. He has also advised other entities, including a pension fund and family office on trading and hedging strategies, including with respect to swaps, as well as investments in derivatives and hedge funds.

He has also undertaken confidential consulting assignments for a variety of clients, including investment and commercial banks, hedge funds, securities and derivatives exchanges, and a futures clearing merchant.

Professor Johannes's full educational and professional qualifications and his publications are listed in his CV, which is attached hereto as Exhibit A. In the last four years, Professor Johannes has not testified as an expert at trial or in a deposition.

II. SUMMARY OF ANTICIPATED TESTIMONY

The following sets forth a summary of Professor Johannes's anticipated testimony. In addition to the bases specified below, Professor Johannes's testimony will be based on his research, teaching, and industry experience, as well as his review of academic literature, documents produced in discovery, and publicly available information.

1. Professor Johannes's testimony will include necessary background so the jury can understand the concepts and bases for his testimony. He will testify:

- There are many ways to participate in public equity markets, and market participants may gain exposure to the price of a security in a variety of ways, including through purchasing stock, shorting, and using derivative instruments.
- Many investors accumulate and manage large positions in securities or financial instruments over time.
- Many factors can impact the price of a security. These include company-specific factors, market factors, and industry factors. Trading can also affect the price of a security or financial instrument. As a general matter, increased demand can increase the price of a security.
- The prices of securities and financial instruments are influenced by expectations of future events.

2. Professor Johannes's testimony will include a description of financial markets in 2020 and 2021. In particular, he will describe the unique circumstances in markets during this period: their initial decline during the COVID-19 pandemic and their subsequent recovery; the fact that numerous publicly traded firms experienced significant price appreciation in late 2020 and early 2021 as compared to other periods; and the unusual volatility in markets in this period and underlying contributing factors, such as the

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COVID pandemic and the adoption of products and new technologies. He will also testify that periods of crises and heightened volatility create unique opportunities for investors to earn outsized gains. Professor Johannes's testimony concerning economic and market conditions will include discussions of public market data such as publicly traded companies' share prices, returns, volumes, and market capitalizations, as well as economic news and literature.

3. Professor Johannes will testify regarding the portfolio of Archegos Capital Management ("Archegos") in 2020 and 2021 and the market, industry, and other factors that impacted the prices of the at-issue securities during this period.¹ For example, Professor Johannes will testify that the stock prices of other companies experienced price increases of a similar magnitude as the increases in the at-issue investments in Archegos's portfolio during the COVID pandemic period. He will compare the performance of the at-issue securities to those of other securities, such as Peloton, Zoom, and Roku, as well as sample sets, including Chinese ADRs and streaming companies, among others. He will testify that many other stocks exhibited similar performance.² In addition, Professor Johannes will testify about the comparative market capitalization of the at-issue firms relative to peers identified by Archegos.

Professor Johannes will compare the performance of the at-issue securities on days that Archegos traded and days that Archegos did not trade, and he will testify that there were significant price increases in the at-issue securities on days and at times Archegos did not trade or traded in low volume. He will testify that this supports that factors unrelated to Archegos's trading influenced the price of the at-issue securities.

Professor Johannes's testimony concerning the performance of the at-issue securities and other securities will be based on public market data, including data on

¹ At this time, we do not anticipate that Professor Johannes will offer testimony about the performance of the at-issue stocks after the collapse of Archegos. As the government recently stated in *United States v. Phillips*, "[t]he way [a stock] price move[s] in the 'days, weeks, and months' after [the] trading ha[s] no legal relevance." Mot. to Exclude Proposed Testimony of Andrew Newman and Kenneth Froot at 17, *United States v. Phillips*, No. 22 Cr. 138 (LJL) (S.D.N.Y. Sept. 29, 2023), ECF No. 40. Based on the government's position in *Phillips*, we expect there will be no evidence or argument suggesting that the stock decline after the Archegos collapse is indicative of manipulation. Should the government reverse course and make a contrary argument to its position in *Phillips*, and should the Court allow the government to introduce evidence about the stock performance of the at-issue securities after the collapse of Archegos, we reserve the right to supplement Professor Johannes's testimony on this issue.

² Data regarding the stock price movements of other stocks and indices that Professor Johannes reviewed is contained in today's defense production of Rule 16 material.

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publicly traded companies' share prices, trading volume, and market capitalization. Professor Johannes's testimony concerning Archegos's investing in the context of these market trends will be based on Archegos's trading and portfolio records and other Archegos documents.

4. Professor Johannes will testify that Archegos's investment strategy in the indictment period is consistent with Archegos's prior practice and with that of other investors. Professor Johannes will provide testimony regarding the characteristics of Archegos's portfolio in 2020 and 2021, and how it was consistent with Archegos's historic approach of maintaining a concentrated and levered portfolio. He will testify that many other investors likewise maintain a concentrated and levered portfolio.

Professor Johannes's testimony concerning Archegos's and other investors' investment strategies, as well as Archegos's portfolio and historic approach, will be based on Archegos's trading and portfolio records, including historical data on its capital and exposure amounts; data from FactSet on other investors' portfolio holdings; public filings by other investors; and academic, industry, and government research.³

5. Professor Johannes will testify that Mr. Hwang's target prices were consistent with certain external research conducted by independent analysts, including blue sky and upside scenarios. In doing so, he will testify about what target prices are, and he will compare Archegos and third-party target prices, scenarios, analyses, and recommendations for the at-issue securities during the relevant period. Professor Johannes will also testify about how potential acquisition events and other factors may influence an investor's target price.

Professor Johannes's testimony concerning target prices and analyst reports will be based on his academic and industry experience, Archegos documents, third-party analyst reports, and CapitalIQ and FactSet data.⁴

6. Professor Johannes will testify that the economic evidence is inconsistent with the government's theory that Archegos dominated/controlled the market for the at-issue securities for numerous reasons.

a. Professor Johannes will testify that a swap purchaser does not control how the swap counterparty hedges the swap during the duration of the swap. He will testify that the swap counterparty may hedge the swap transaction in a variety of ways, including by purchasing the underlying shares or entering into an offsetting swap

³ FactSet data on other investors' portfolio holdings are contained in today's defense production of Rule 16 material.

⁴ Third-party analyst reports and CapitalIQ and FactSet target price data are contained in today's defense production of Rule 16 material.

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transaction. He will testify that there are economic incentives for swap counterparties to hedge through offsetting swap transactions.

Professor Johannes will further testify that swap counterparties that purchase underlying shares as hedges have economic incentives to lend out those shares to third parties, including for use in a short sale, which would result in those shares being sold on the open market. Because a swap counterparty can lend the shares used for hedging a total return swap, Archegos had no ability to control whether or not the underlying securities were held by the counterparty or traded by other investors.

Professor Johannes's testimony on these issues will be based on his academic and industry experience as well as academic and government research.

b. Professor Johannes will testify the counterparties' documents indicate that a significant number of counterparties did not maintain underlying stock hedges on Archegos swaps on a one-to-one basis.⁵

c. Professor Johannes will testify that during the relevant period, there was significant short interest in the at-issue securities and the cost of borrowing those securities was generally low, indicating that it was generally easy to short sell the at-issue securities.

d. Professor Johannes will testify that the volume of trading in the at-issue securities unrelated to any hedging of Archegos's swap transactions shows that Archegos's swaps did not control the amount of shares that traded.

Professor Johannes's testimony concerning paragraphs 6(b)-(d) will be based on public market data, including data on daily share price and trading volume, short interest and lending fees for the at-issue and other securities, Archegos's trading and portfolio records, Archegos's counterparties' trading records and other documents, and academic literature.

7. Professor Johannes will testify that company-specific factors, market factors, and industry factors can explain much or all of the price movement in the at-issue securities on certain days on which Archegos traded. This testimony is based on event study analyses for the at-issue securities.

⁵ Professor Johannes's expected testimony on this point is based on his review of documents to date. If newly produced documents affect his expected testimony on this issue, we will supplement the expert disclosure accordingly.

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a. Professor Johannes will testify that an event study is a type of analysis commonly used in financial economics to estimate the relation between releases of new information and changes in a company's security prices.⁶

b. Professor Johannes will testify about the performance of the at-issue securities on days that the government has alleged involved manipulation. He will testify that the performance of the at-issue securities on these days can be explained by market and industry factors and by company-specific factors, unrelated to Archegos's trading, and/or that Archegos did not trade in high volumes on those days. These dates include:⁷

Stock	Date
VIAC	2020-06-11
TME	2020-10-28
DISCA	2020-11-25
TME	2020-11-25
DISCA	2020-11-27
DISCA	2020-11-30
DISCA	2020-12-01
GSX	2020-12-01
GSX	2020-12-02
TME	2020-12-04
GSX	2020-12-11
DISCA	2020-12-16

⁶ Event study analysis takes into account the relationship between a company's stock returns and the corresponding returns on market and/or industry indices on the dates of interest. This is typically done by using regression analysis to estimate the relation between a company's stock returns and the corresponding returns on a market index and/or industry index over a benchmark period commonly referred to as the estimation period. Parameter estimates from the regression model are then used along with the actual performance of the market index and/or industry index on the days of interest to estimate an expected return. The expected return is then subtracted from the actual return to estimate a residual return (sometimes referred to as an "abnormal return" or "market-adjusted return") on the dates of interest. *See, e.g., A. Craig MacKinlay, Event Studies in Economics and Finance*, 35 J. of Econ. Literature 13 (1997).

⁷ This list is based on dates referenced in the Indictment or that the government has separately raised or has otherwise identified as the basis for its manipulation allegations. The defense reserves the right to supplement its disclosures if the government identifies other particular trades that it alleges to be manipulative, and seeks to introduce such allegations at trial. To the extent the Court permits the government to introduce any such new allegations, the defense reserves the right to supplement its disclosures to address them.

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GSX	2020-12-21
DISCA	2020-12-24
GSX	2020-12-28
TME	2020-12-28
DISCA	2020-12-29
DISCA	2020-12-30
DISCA	2020-12-31
GSX	2020-12-31
TME	2020-12-31
GSX	2021-01-04
TME	2021-01-04
VIAC	2021-02-02
VIAC	2021-02-09
GSX	2021-02-17
VIAC	2021-02-18
TME	2021-02-22
TME	2021-02-23
TME	2021-02-24
VIAC	2021-02-25
TME	2021-02-25
VIAC	2021-02-26
TME	2021-02-26
TME	2021-03-02
TME	2021-03-03
VIAC	2021-03-04
TME	2021-03-04
TME	2021-03-05
TME	2021-03-08
VIAC	2021-03-09
TME	2021-03-09
TME	2021-03-10
TME	2021-03-11
TME	2021-03-12
FTCH	2021-03-15
IQ	2021-03-15
VIPS	2021-03-15
BIDU	2021-03-16
FUTU	2021-03-16
GSX	2021-03-16
IQ	2021-03-16
TME	2021-03-16
VIAC	2021-03-16
VIAC	2021-03-17

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TME	2021-03-17
GSX	2021-03-18
TME	2021-03-18

Professor Johannes's testimony concerning these price movements will be based on Archegos's trading records and other Archegos documents, data on publicly traded companies' daily share prices, returns, and trading volume, news and analyst reports related to the at-issue securities, and academic literature.⁸

8. Professor Johannes will testify that economic evidence contradicts the government's theory that the prices of the at-issue securities were artificially inflated over the indictment period. Specifically, he will testify that:

a. Contemporaneous valuations of market participants throughout the indictment period contradict the notion that prices were artificially inflated, as evidenced by third-party analyst reports and other market commentary.

b. The at-issue securities traded in an efficient market, and therefore, any purportedly artificial prices would tend to revert.

c. The prices of the at-issue securities rose at times that Archegos was not transacting in swaps in the at-issue securities and/or did not rise at times that Archegos was transacting in swaps.⁹

d. Market reactions to earnings announcements of the at-issue securities contradict the notion that prices were artificially inflated.

Professor Johannes's testimony concerning the prices of the at-issue securities will be based on public market data; company earnings announcements, third-party analyst reports, and news related to the at-issue securities; and academic literature.

9. Professor Johannes will testify that Archegos's trades involved real economic exposure, in contrast to trades that involve no real economic exposure. This testimony will be based on Archegos's trading and portfolio records and other Archegos documents.

⁸ The data and other materials underlying the event studies concerning the at-issue securities are contained in today's defense production of Rule 16 material.

⁹ In addition, Professor Johannes will testify that with respect to Archegos's at-issue short positions, the price of the relevant securities did not decrease at times that Archegos was actively transacting in swaps.

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10. Professor Johannes will testify that the trading techniques used by Archegos to gain exposure to the at-issue securities are consistent with those of an investor seeking to accumulate significant exposure to an underlying security or financial instrument. Professor Johannes will testify that certain trading methods used during the indictment period, such as the use of trading algorithms, limit prices, purchasing in dark pools, and purchasing toward the end of the market day (“trading into the close”), are all methods that are commonly used by traders and often have the effect of minimizing price impact. Professor Johannes will testify that trading volume generally follows a U-shaped pattern and is typically higher at the beginning and the end of the day, and that was generally true for the at-issue securities during the relevant period. Professor Johannes will further testify that there was a market-wide increase in pre-market trading in 2020 and 2021.

Professor Johannes will testify that many of the trading techniques that Archegos used when gaining exposure to the at-issue securities, such as the use of multiple counterparties and the use of total return swaps, were also used by Archegos to gain exposure to highly liquid securities and ETFs, among other securities that are not at issue, both during the period of alleged manipulative trading and in other periods.

Professor Johannes’s testimony concerning trading techniques will be based on Archegos’s trading and portfolio records, records of Archegos’s communications, Archegos’s counterparties’ trading records and other documents, public market data, including data on share prices and intraday trading volume, and academic literature.

11. Professor Johannes will explain the economic purposes of the use of total return swaps, multiple counterparties, the use of leverage, pre-market trading, raising limit prices as the price of a stock increases, adding to positions as the price of a stock declines, trading in volumes above approximately 10-15% of a day’s total trading volume, trading into the close, same-day purchases and sales, and trading around a core position. The basis for this testimony will be Professor Johannes’s academic and industry experience, as well as academic and economic research.

Professor Johannes will further testify that many of Archegos’s trading methods are consistent with industry standards and commonly used by other investors in the industry. Professor Johannes will also testify that it is standard for investors to take steps to avoid disclosing their positions to the market, because the public disclosure of an investor’s position in a security can impact the price of that security, and lead to copycat investing, frontrunning, or other trading that could be disadvantageous to the investor.

Professor Johannes’s testimony concerning trading methods will be based on Archegos’s trading and portfolio records, records of Archegos’s communications, Archegos’s counterparties’ trading records and other documents, public market data, including data on share prices and intraday trading volume, public comment letters, public filings by other investors, and academic literature.

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12. Professor Johannes will offer testimony relating to the week of March 22, 2021. He will explain that, on average, prices of securities fall after the announcement of a secondary offering and subsequently rise. Professor Johannes will testify that the idiosyncratic decreases in the values of Viacom and Discovery on the one hand, and at-issue Chinese ADRs on the other hand, within days of each other, while the market otherwise remained positive, were independent, outlying share price events. Professor Johannes will further testify that the occurrence of these events within days of each other was highly unlikely. Professor Johannes will further testify that if only the Viacom and Discovery declines had happened that week, Archegos could have had billions of dollars of additional capital on March 25, 2021, all else equal. Similarly, he will testify, if only the at-issue Chinese ADR declines had happened that week, Archegos could have had billions of dollars of additional capital on March 25, 2021, all else equal. Professor Johannes will further testify regarding the declines of Archegos's investments in the at-issue U.S. streaming companies and Chinese ADRs, as well as its portfolio as a whole, in the context of Archegos's historical performance.

Professor Johannes's testimony concerning the week of March 22, 2021 will be based on Archegos's historical trading and portfolio records, public market data, including data on publicly traded companies' share prices, market news, and academic literature.

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III. RESERVATION OF RIGHTS TO SUPPLEMENT DISCLOSURES

The defense reserves their right to supplement and/or amend these disclosures, including in response to the government's disclosures and the evidence presented in its case-in-chief, as well as any additional evidence produced in discovery, including but not limited to evidence produced by counterparties.

Please let us know if you have any questions. We are available to meet and confer to further discuss these disclosures.

Very truly yours,

Barry H. Berke
Dani R. James
Jordan Estes

cc: Mary E. Mulligan
Timothy M. Haggerty

Reviewed and Approved by:

Dr. Michael Johannes

EXHIBIT A

Michael Johannes

Ann F. Kaplan Professor of Business
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Academic Appointments

- 2017-present, Ann F. Kaplan Professor of Business, Graduate School of Business, Columbia University.
- 2012-2017, Professor of Finance, Graduate School of Business, Columbia University.
- 2012-present, member and committee member of the Center for Financial and Business Analytics for the Data Science Institute, The Fu Foundation School of Engineering and Applied Science, Columbia University.
- 2007 to 2011, Associate Professor of Finance (with tenure), Graduate School of Business, Columbia University.
- 2005 to 2007, Roger F. Murray Associate Professor of Finance, Graduate School of Business, Columbia University.
- Spring 2006, Visiting Scholar, Graduate School of Business, Stanford University.
- Fall 2005, Visiting Associate Professor of Finance, Kellogg Graduate School of Management, Northwestern University.
- 2004 to 2005, Associate Professor, Graduate School of Business, Columbia University.
- 2000 to 2004, Assistant Professor, Graduate School of Business, Columbia University.

University Education

- Ph.D., M.A., Department of Economics, University of Chicago, 2000 (Ph.D. thesis committee: John Cochrane, Lars Hansen (chair), and Jose Scheinkman).
- B.S. Marquette University, summa cum laude, *Phi Beta Kappa*, 1995.

Teaching

- Columbia University, Graduate School of Business:

- Capital Markets, MBA (2001-2005, 2007, 2010, 2018-2019, 2022), Executive MBA (2010, 2011, 2013), and Global Executive MBA (2012-2019).
- Ph.D.: Models and Methods of Continuous-Time Finance (2001-2004, 2007-2008), Introduction to Continuous-Time Finance (2019-2023), Advanced Derivatives (2019-2023), Time Series Analysis (2018-2021), Computational Methods for Bayesian inference (Fall 2007, 2009-2012).
- Executive Education: Complete Course in Professional Risk Management (2007-2012), Eruditus Executive Program in Management (2015-2018), Deutsche Bank Associates Program (2016-2018), AMP Program (2016-2018), and Global Banking Program (2016-2019), Options Strategy (2022-2023).
- Northwestern University, Kellogg Graduate School of Management: Derivatives I, MBA (Fall 2005).
- Princeton University, Woodrow Wilson School of Public Policy: A Short Course on Financial Markets: Mortgage and Derivative Markets (2010-2018) and Treasury and Credit Markets (2018-2019).

Publications

Journal Articles

1. “The Impact of Jumps in Equity Index Volatility and Returns” (with Bjorn Eraker and Nicholas Polson), 2003, *Journal of Finance* 58, 1269-1300.
2. “The Economic and Statistical Role of Jumps to Interest Rates,” 2004, *Journal of Finance* 59, 227-260. Nominated for the Smith-Breeden prize.
3. “Pricing Collateralized Swaps” (with Suresh Sundaresan), 2007, *Journal of Finance* 62, 383-410.
4. “Model Specification and Risk Premia: Evidence from S&P 500 Futures Options Market” (with Mark Broadie and Mike Chernov), 2007, *Journal of Finance* 62, 1453-1490.
5. “MCMC MLE” (with Eric Jacquier and Nick Polson), 2007, *Journal of Econometrics* 137, 615-640.
6. “Optimal Filtering of Jump-Diffusions: Extracting Latent States from Asset Prices” (with Nicholas Polson and Jon Stroud), 2009, *Review of Financial Studies* 22: 2759 – 2799.
7. “Understanding Expected Option Returns” (with Mark Broadie and Mike Chernov), 2009, *Review of Financial Studies* 22, 4493 – 4529.
8. “Particle Learning and Smoothing,” (with Carlos Carvalho, Hedibert Lopes and Nick Polson), 2010, *Statistical Science*, 25, 88-106.
9. “Particle learning: Simulation-based Bayesian inference,” *Bayesian Statistics* 9, 2011, (with Carlos Carvalho, Hedibert Lopes, and Nicholas Polson), 317-360.
10. “Sequential Learning, Predictability, and Optimal Portfolio Returns” (with Nick Polson and Arthur Korteweg), 2014, *Journal of Finance* 69, 611-644.
11. “Bayesian Modeling and Forecasting of 24 Hour High-Frequency Volatility” (with Jon Stroud), 2014, *Journal of the American Statistical Association* 109, 1368-1384.

12. “Parameter Learning in General Equilibrium: The Asset Pricing Implications” (with Pierre Collin-Dufresne and Lars Lochstoer), 2016, *American Economic Review* 106 (3), 664-698.
13. “Learning about Consumption Dynamics” (with Lars Lochstoer and Ethan Mou), 2016, *Journal of Finance* 71, 551-600.
14. “Asset pricing when “This Time is Different”” (with Pierre Collin-Dufresne and Lars Lochstoer), 2017, *Review of Financial Studies*, 30, 505-538.
15. “Option Pricing of Earnings Announcement Risk” (with Andrew Dubinsky, Andreas Kaeck, and Norman Seeger), 2019, *Review of Financial Studies* 32, 646-687.

Book manuscript

- *Computational Methods for Bayesian Inference: MCMC methods and Particle Filtering*, with Nicholas Polson.

Book Chapters

- Bayesian computation in finance, (with Hore, Lopes, McCulloch and Polson) in *Frontiers of Statistical Decision Making and Bayesian Analysis*, edited by Chen, M.-H., Dey, D., Mueller, P., Sun, D. and Ye, K., 2010, 383-396.

Invited Comments

- Comment on Pastorello, Patilea and Renault, “Iterative and Recursive Estimation in Structural Nonadaptive Models,” with Nick Polson, *Journal of Business & Economic Statistics* 21, 449-509.
- Comment on Doucet et al. “Particle MCMC” (with Nick Polson and Seung Yae), 2010, *Journal of Royal Statistical Society, Series B*, 72, 324-326.

Working Papers and Work in Progress

- “Processing Earnings Information: Earnings Response Coefficients and Post-Earnings Announcement Drift,” 2022, with Andreas Kaeck and Norman Seeger.
- “Time-varying Macroeconomic Risk,” 2022, with Norman Seeger and Jon Stroud.
- “FOMC Announcement Event Risk,” 2023, with Andreas Kaeck and Norman Seeger.
- “VIX Dynamics around FOMC announcements,” with Andreas Kaeck, Norman Seeger and Neel Shah.

Conference and Seminar Presentations

- Research seminars:
 - Brigham Young University (2014)
 - Carnegie Mellon (GSIA, 2003)
 - Caspian Capital Management (2004)

- Chicago Quantitative Alliance (2012)
 - Citigroup Fixed Income Research (2004)
 - Columbia (Economics, 2013)
 - Columbia University (GSB, 2000, numerous as faculty member)
 - Duke University (Fuqua, 1999)
 - EPFL/University of Lausanne (2013)
 - Federal Reserve Board of Governors (2000)
 - Federal Reserve Bank of New York (2006, 2009, 2018)
 - Federal Reserve (San Francisco, 2013)
 - FMA
 - Goldman, Sachs Asset Management (2005, 2007)
 - Harvard University (Economics, 2008)
 - Institute for Financial Research in Stockholm (2011)
 - Northwestern University (Kellogg, 2000, 2003, 2005)
 - Lehman Brothers Fixed Income Research (2002)
 - London Business School (2002)
 - London School of Economics (2002)
 - McGill University (2008)
 - MIT (Sloan, 2005)
 - Morgan Stanley Fixed Income Research (2003)
 - NYU (Stern, 2001)
 - Oxford University (GSB, 2008)
 - Rice University (2009)
 - Stanford University (GSB, 2003, 2006, 2011)
 - UCLA (Anderson School, 2013)
 - University of Amsterdam/Duisenberg School of Finance/Tinbergen Institute (2012)
 - University of California-Berkeley (GSB, 2003)
 - University of Chicago (GSB, 1999, 2008)
 - University of Houston (2015)
 - University of Illinois Champagne/Urbana (2004, 2008)
 - University of Minnesota (GSB, 2006)
 - University of Montreal (2000)
 - University of Pennsylvania (Economics, 2005)
 - University of Southern California (2004)
 - University of Texas at Austin (McCombs, 2003, 2009)
 - University of Wisconsin (2011)
 - Washington University in St. Louis (GSB, 2005)
 - Yale University (SOM, 2007)
- Conference presentations/discussions:

- 14th Australasia Finance Conference (Keynote speaker, 2001)
- American Finance Association (2008 (2), discussant, 2001, 2004, 2006, 2008, 2009)
- Bank of Canada Fixed Income Conference (discussant, 2006)
- Canadian Derivatives Institute (2013, 2019 (discussant))
- Cirano Conference on Financial Econometrics (2000, 2003, 2009, discussant 2006, 2007)
- Cirano Conference on Monte Carlo Methods (2003)
- Columbia Financial Engineering Workshop on Market Liquidity (2008),
- Conference on Derivatives Securities and Risk, Center for Applied Probability of Columbia University (2000)
- Conference on Financial Innovation: 35 Years of Black/Scholes and Merton (2008),
- Econometric Society Meetings (1999, 2000, 2007; discussant 2003, 2006)
- European Finance Association (2013 discussant, 2010, 2013)
- “Event Risk” Conference Mathematical Science Research Institute (2002)
- GAIM 2007 Hedge Fund Conference (presenter, panelist)
- IFSID & Bank of Canada Conference on Derivatives (Keynote Address, 2013)
- International Association of Financial Engineers Liquidity Buffers Conference (2007)
- London Oxford Financial Econometrics Conference (2008)
- Managed Futures Association (2013, panelist)
- NBER Asset Pricing Group (2002, 2006; discussant in 1999)
- NBER Commodities Group (discussant, 2015)
- NBER Long Term Asset Pricing (discussant, 2021)
- Princeton Conference on Financial Econometrics (2001)
- SBIES (Bayesian Inference in Econometrics and Statistics) Conference (2008)
- SoFiE Conference (2009)
- Society of Quantitative Analysts (2009)
- Western Finance Association (2001, 2002, 2003, 2005; Discussant, 2004)

Ph.D. Students With Significant Advisory Role

- Andrew Chen.
- Kodjo Apedjinou (First placement, Lehman Brothers).
- Andrew Dubinsky (Goldman, Sachs).
- Philippe Mueller (LSE)
- Sam Cheung (Deutsche Bank)
- Andreas Stathopoulos (USC)
- Yael Eisenthal (Goldman, Sachs Asset Management)
- Ethan Mou (Merrill Lynch)
- Damla Gunes (Morgan Stanley)

- Ravi Sastry (SMU)
- Alexey Semenov (industry).
- Miguel Morin (Cambridge University).
- Kerem Tuzcuoglu (Bank of Canada)
- Mohammadreza Bolandnazar (Texas A&M)

Awards and Honors

- EMBA-Global Americas & Europe Class of 2013 Commitment to Excellence award.
- 2011 Columbia Business School Dean's Award for Teaching Excellence (in an elective course).
- Nominated for the Smith-Breeden best-paper prize, *Journal of Finance*, 2004.
- Pricing Collateralized Swaps (with Suresh Sundaresan), 2007, *Journal of Finance*, was awarded the "Best Academic Paper of the Year Award" at GAIM (Global Alternative Investment Managers) annual conference, 2007.
- External grant for fixed income and derivatives research (\$150,000, anonymous hedge fund).
- Chazen Fellowship, 2001.
- Center for International Business Education research grant, 2001.

Profession service and refereeing

- Referee for the following journals: Computational Statistics and Data Analysis, Econometrica, Finance and Stochastics, Financial Analysts Journal, Finance Research Letters, Journal of Business and Economic Statistics, Journal of Computational Finance, Journal of Economic Dynamics and Control, Journal of Empirical Finance, Journal of Finance, Journal of Financial and Quantitative Analysis, Journal of Financial Econometrics, Journal of Financial Economics, Journal of Political Economy, Journal of Econometrics, Journal of Economic Theory, Journal of Monetary Economics, Journal of the American Statistical Association, Journal of the Royal Statistical Association, Series B, Management Science, Review of Asset Pricing Studies, Review of Economic Studies, Review of Economics and Statistics, Review of Financial Studies, Quantitative Finance, The Quarterly Journal of Economics, Social Sciences and Humanities Research Council of Canada, and The National Science Foundation.
- Associate Editor: Journal of Econometrics (2016-2018), Journal of Financial Econometrics (2007-2012), Management Science (2007-2014), Journal of Business and Economic Statistics (2009-2013).
- Program Committees: Western Finance Association Meeting (2007-2013), American Finance Association (2009, 2010), European Finance Association (2013).
- Member, Research Subcommittee of PRMIA, the Professional Risk Managers International Association, 2011-2103.

School and University service

- Finance Division Chair, 2022-.
- Member of Columbia Business School's Executive Committee: 2022-.
- Master's of Science in Financial Economics, Program Director, 2011-2021.
- Business school committees: Manhattanville Planning Committee (2020-21), MS Engineering/GSB MBA Joint Working Group (2020-2021), Faculty Governance Review Committee (Chair, 2017-2018), MBA Conduct Committee (2003-2004), Student-Faculty Academic Affairs Committee, 2002-2004.
- Finance Division committees: Finance Division Recruiting Committee (2001-2002, 2002-2003, 2003-2004, 2007-2008), Finance curriculum committee (Chair, 2010-2011), Finance seminar organizer (2001-2002, 2004-2005), Capital Markets Course Coordinator (2011- 2014), Future of Finance Division Committee (Chair, 2021), and Finance Division Recruiting Committee (Chair, 2022).
- University: Financial Analytics Committee, Institute for Data Sciences and Engineering, Fu Foundation School of Engineering, Columbia University: 2012-.
- MBA Symposium, 2002, "Alternative Perspectives on Wall Street," organizer.
- University Senate: 2004-2006.
- University Ad-hoc tenure review committee, 2008.
- School of Professional Studies, Academic Oversight Committee (2016-2018)

Outside activities (Disclosed in accordance with Columbia Business School policies)

- Consultant to Caspian Capital Management, Markit, Lexecon, O'Brien International Family Office/O'Brien Investment Group, PriceWaterhouseCoopers, and various confidential litigation consulting engagements.
- CLSA (speaking engagement).
- Member, Standard and Poor's Academic Advisory Council, 2013.
- Expert witness and testimonial experience
 - Expert Testimony (9/22/2023): NFA Arbitration, INTL FC Stone Financial, Inc., v. Henault, Torrie, Mead and Rodriguez.
 - Expert Report (6/28/023): AAA Arbitration, StoneX Markets LLC f/k/a INTL FCStone Markets, LLC v. MIG Agro General Trading LLC.
 - Expert Testimony (6/21/2023): NFA Arbitration, INTL FC Stone Financial, Inc., v. Greaves, Holcomb, Pradko, and Slanec.
 - Expert Testimony (2/9 and 2/10/2023): NFA Arbitration, INTL FC Stone Financial, Inc., v. Harlow, Jones, Andriyevka, Afhsar, Bromley, and Silbart.
 - Expert Testimony (12/1/2022): NFA Arbitration, INTL FC Stone Financial, Inc., v. Rutz, Held, Hargreaves, Ahmad, Fialk, and Chin.

- Expert Testimony (8/11/2022): NFA Arbitration, INTL FC Stone v. Love, Nakeeta, Nakeeta, Narasimhalu, Neusel, and Westover.
- Expert Report (6/18/2019), Deposition (9/5/2019), and Rebuttal Report (11/27/2019): In RE: Interest Rates Swaps Antitrust Litigation, MDL No. 2704.
- Expert Report (10/9/2012), Rebuttal Report (10/20/2012) and Testimony (10/26-27/2012): In *Jefferies & Company, Inc. v. The NASDAQ OMX Group, Inc., Derivatives Clearing Group, LLC, and International Derivatives Clearinghouse, LLC*. New York Supreme Court, New York County, #652560/2011.
- Expert Report (6/15/2012): In *Advanced Analytics, Inc., v. Citigroup Global Markets, et al.* U.S. District Court, Southern District of New York, #1:04-cv-03531-LTS-HBP.